ORIGINAL ARTICLE

Determining the Effect of Educational Portfolio on Critical Thinking of Nursing Students

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ABSTRACT

Background: Critical thinking as an essential component of nursing practice represents the nurse's cognitive abilities in information processing and decision making as key components of nursing education.
Aim: To determine the effect of educational portfolio on critical thinking of nursing students.
Methods: This quasi-experimental study was conducted using pre-test, intervention and post-test. 31 seventh semester nursing students were randomly divided into case (n=15) and control (n=16) groups. In the case group, the portfolio training program was conducted under the supervision of the researcher and the control group participated in their routine program. Data collection tool was California Personal Information Questionnaire and California Critical Thinking Skills Questionnaire. Results were analyzed using descriptive statistics.
Results: The mean score of the students in the experimental group increased significantly from 5.93 to 13.87 (p = <0.001), while in the control group it increased from 0.009 to 08.9 (p = 0.095) which was not significant.
Conclusion: The results of this study indicated that portfolio method promoted critical thinking scores in nursing students.In nursing education system, critical thinking needs to be fostered by creating a proper structure and framework to present effective clinical practice. In this way, the graduates of this field can use the knowledge, thinking skills and deduction reasoning to provide reasonable services to healthy and sick people in society and health centers.
Keywords: Educational portfolio, nursing practice, nursing education

INTRODUCTION

Developing thinking power is one of the main goals of education. Thinking to improve the thinking process is at the heart of critical thinking[1,2] and critical thinking is the ability to explore a problem or situation in order to integrate all available information about the subject, which leads to a solution or hypothesis to justify one's orientation[3] .Critical thinking is also examining hypotheses, understanding hidden values, evaluating evidence, and measuring conclusion[4]

Critical thinking is a nonlinear process in which the context, criteria, and attributes of a problem are taken into account and new information is organized and previous information is refunded to give a new response to the new situation[5].

Critical thinking skills are interpretation, inference, explanation, evaluation, self-regulation, analysis, deductive and inductive reasoning[6] ؛The Delphi Research Project of the American Philosophers' Association presents an ideal critical thinker: An ideal Critical thinker use to search[7].

Education experts agree that critical thinking should be an integral part of education at all times because it is a kind of thinking that leads to the best solution by analyzing, evaluating, selecting and applying, and this is what the world needs today[8].

In recent years, clinical settings in nursing have undergone many changes. In such environments, providing safe and effective patient care that conforms to standards will only be possible by developing critical thinking skills in nurses[9].

Nurses who use critical thinking skills in care giving will be more confident in decision-making process and will be able to solve clinical problems and decision-making problems and defense their performance[10-12].

Given that the main mission of medical education is to train competent and capable individuals who have the necessary skills and attitudes to maintain and enhance individual's health in the community[13] and with the advent of new information approaches, the need to use modern clinical measurement methods is increasingly felt[14] . Portfolio is one of the active learning strategies and writing assignments for clinical instruction through which learners present their projects. Self-assessment portfolios are performed using activity logs and their instruction move from a teacher-centered approach to a student-centered approach[13,14].

The strengths of the portfolio are as follows: Helping students develop critical thinking, evaluating areas that cannot be done by traditional methods, helping studentsbeing independent in learning, promoting studentsresponsibility[15,16] recognizing environmental factors which affect learning[17]،and promoting clinical education methods[18].

Using critical thinking education methods in nursing students, the caregiver will be able to make the right decision and can provide the best service in care process[19]

.This, ultimately improves disease outcomes and leads to a faster recovery of disease by providing basic and correct care[20] .

Therefore, considering the importance of educating nurses as critical thinkers, and considering the new draft philosophy of nursing education in Iran that emphasizes critical thinking education, nursing educators need to become familiar with this important concept and the application of new teaching methods can create, facilitate and develop this method in students. For this purpose, in this article, the ability of critical thinking of nursing students and intervention for effective teaching of critical thinking of nursing were investigated using portfolio.

MATERIAL AND METHOD

This study was a quasi-experimental study approved by REC.1392.110 which was performed in the form of pre-test, intervention and post-test. The study population consisted of all seventh semester students of Nursing School of Estahban Azad University of Fars who were completing internships in ICU during the first semester of the academic year 2018-2019. The research location was Namazi and ShahidFaghihi Hospital affiliated to Shiraz University of Medical Sciences.The sample was 31 students. There were 51 Seventh semester students, 20 of whom were excluded from the sample because some of them were not eager to participate in the research project and some were suspended in the previous semester. They were randomly divided into two experimental (n=15) and a control (n= 6) groups. Each group consisted of 5-6 students and they were randomly assigned according to the grouping of the faculty. Since October 2018, they attended in the departments to spend internships in accordance to the university's plan.

The study period in ICU units was 20 days for each group of students. Data collection tools included: 1-Personal consent form. 2-Demographic information form (including age, gender, and mean score) 3- California Critical Thinking Skills Standard Questionnaire.The questionnaire had 34 questions and evaluates five skills including interpretive, inferential, evaluative, inductive reasoning and deductive reasoning skills.Interpretive skills includeClassification, Decoding Sentences, Meaning Enlightenment, Reviewing Ideas, and Analyzing Ideas; Inferential skills include searching for evidence, speculating on alternatives, and extracting results; Evaluation skills include evaluating claims, evaluating arguments, expressing results, justifying procedures, and presenting arguments; deductive reasoning includes logical reasoning in mathematics;inductive reasoning includes Measuring the conclusions of a discussion after dealing with the facts of assumptions.

It took 45 minutes to complete this questionnaire. From the analysis of the questions in this test, a total of six scores were obtained with five subscales including analysis and interpretation, inference evaluation, logical inference extraction, inductive reasoning and deductive reasoning. This tool was useful for evaluating logical thinking ability (evaluating program effectiveness, research, and continuing education)[21,22] .After obtaining permission from the University of Medical Sciences, the groups selected as the experimental group were introduced and their students were asked to participate in a portfolio orientation workshop on the dates announced by the faculty. The students in the Experimental Group participated in the Portfolio Lecture Workshop at the School of Nursing for 6 hours (the workshop was co-organized by the College at a time when it did not interfere with the students' study hours and internships). In this workshop, the were introduced to portfolio definitions, features, way of completion and its application on the patient's using instructional slides.In addition, a personal consent form for student satisfaction was obtained from each student. After completing the workshop and thoroughly familiarizing the students with the portfolio, the goals and the necessity of its using during the internship were taught to them in order to be entered the study with full knowledge and satisfaction.The raw version of the portfolio, obtained from the University of Nottingham, UK, was reviewed by the researcher and several other nursing professors and modified to be fit to the students' knowledge level and be used as a guide for students to complete the portfolio. The portfolio consisted of 13 forms, which were presented to students as a pocketbook. Form No. 1 included student and instructor information, department name and hospital name; Form No. 2 contained a summary of the portfolio and its educational goals; Form No. 3 included the list of expected minimum educational milestones in the relevant section; Form No. 4 included expected performance tables in the related department; Form No.5 included student personal development chart; Form No.6 included direct supervision of student clinical skills, Form No.7 included question and answer between student and instructor, Form No.8 included reflective discussion, Form No.9 included Feedback Registration, Form No.10 Included recording observed learning , Form No.11 included Final Work, Form No.12 contained a list of expected skills that the student had not achieved, and Form No.13 contained a list of strengths and weaknesses of the student.

In the workshop, several raw versions of the portfolio were completed by students with the help of a researcher, and students' questions and uncertainties about how to complete the portfolio were answered. Finally, the educational slides presented in the workshop were given to each student. The portfolio booklet was prepared and given to a number of students. On the first and the last day of the internship, students in the experimental and control groups were evaluated by the California Critical Thinking Questionnaire. The students were required to hand over their research papers to the researcher during the internship to provide an appropriate feedback to the student after a careful study. After the intervention, post-test was performed and the data were compared and analyzed by SPSS V20 software. Mean and standard deviation indices and frequency distribution tables were used to describe the data and ANCOVA test was used to analyze the data.

RESULTS

Thirty one students participated in this study, 15 of which were in the experimental group (48.4%) and 16 in the control group (51.6%). Of 31 patients, 15 were male

(48.3%) and 16 were female (51.6%). There were 7 males (46.6%) and 8 females (53.3%) in the experimental group and the control group had the same number of male and female (50.00%). Mean age in the experimental group was 22.27 and in the control group it was 22.65. The mean score in the experimental group was 16.23 and in the control group it was 16.15.

As it is seen in Table 1, the mean age and mean score were almost identical in the two experimental and control groups. Chi-square test was used to compare the experimental and control groups with no significant difference between the two groups (Chi - Square = 0.8). In general, it can be stated that there was a good homogenization between the experimental and control groups in terms of age, sex and average.

As it is seen in Table 2, the mean scores of the experimental group in all dimensions increased significantly before and after the intervention (p <0/001), whereas there was no significant difference between the mean scores of the control group in all dimensions before and after the intervention (p> 0/01). The overall scores of the students in the experimental group increased significantly from 5.93 to 13.87 (p = <0.001), while in the control group, this score increased from 0.009 to 08.9 (p = 0.095) which was not significant.

Table 1: Comparison of quantitative variables in experimental and control groups

variables	Mean score of experimental group	Mean score of control group	scoreTotal mean
Age (year)	0.99_+) 22.5	(1.61 _+)22.5	1.33 _+) 22 (
mean	(0.84 _+) 16.23	(1.02_+) 16.15	_+)16.19 (0.92

Table 2: Comparison of critical thinking scores of nursing students before and after intervention in experimental and control groups

Row	Group / Critical thinking skills	Experimental group				control group				P value Case / Control
		Before intervention		After the intervention		Before intervention		After the intervention		
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	
1	Interpretive skill	0/87	0/83	3/2	1/87	1/73	1/91	1/78	1/18	<0/001 / 0/73
2	Evaluative skill	3/60	1/81	6/67	2/32	4/47	1/50	4/47	1/60	<0/001 / 1/00
3	Inferential skill	1/47	1/41	4/00	1/51	2/80	1/57	2/90	0/93	<0/001 / 0/47
4	deductive reasoning skill	2/00	1/60	5/80	1/94	3/27	1/23	3/33	0/98	0/001 / 0/47
5	Inductive reasoning skill	3/73	1/22	6/60	2/23	4/87	1/99	4/92	1/55	<0/001 / 0/11
6	Total score	5/93	2/34	13/87	4/39	9/00	2/90	9/08	2/09	<0/001 / 0/095

DISCUSSION

The purpose of this study was to determine the effect of educational portfolio on critical thinking of nursing students in BS degree.

The findings of this study showed that the critical thinking score of senior nursing students who participated in this study was poor. Although the mean scores of the experimental group after the intervention were significantly higher than the control group and those before the intervention, the mean scores were lower than other studies in other countries.

Askari[23]and Khalili [24]in two separate studies examined the critical thinking scores of nursing students in Iran. The results of both studies indicated that the critical thinking scores of the participants were low.

In a study by Shafiei et al. in Zahedan, 136 students (112 females, 24 males) were assessed using California Critical Thinking Skills Test. The results of this study

showed that none of the students in this test achieved an acceptable score.

The results of our study were in line with the findings of these studies. Studies in different universities around the country indicate that the average score of critical thinking of nursing students in Iran is low.

While McGrath's research in Canada and Bowel's studyin America[25,26], showed high critical thinking scores and existence of strong critical thinking in the students under the study. It may be inferred from the inconsistency of the present study that the current educational programs in nursing education in Iranian universities are in a way that either they do not teach critical thinking skills or impede the development of this skill in students.

Researchers believe that at different levels of educational system in Iranian, mindfulness and effort to increase content retention are more practiced than training critical thinking skills. The results of several studies in Iran also confirm this: Traditional educational methods in the country provide individuals with a wealth of theoretical information that make them incapable of solving the smallest community problems in the future[27,28,29].

In a review study, Ip reported the results of his research. The dominant educational system lacks critical thinking training in nursing courses[30] .Other studies indicate the weakness of the education system in developing critical thinking skills which do not apply these skills in problem solving[11,31-33]. Nursing graduates need to think independently and make appropriate decisions when dealing with patients' problems and critical situations. This requires development of critical thinking; otherwise, nurses will become indisputable practitioners of physicians' orders, which can lead to poor patient care and create life-threatening risks[33].

The results of the present study show that education increased the total score and scores of different dimensions of the questionnaire.Comparison of changes in scores of different dimensions of Critical Thinking Questionnaire and overall score of critical thinking of nursing students in the experimental groups showed a significant difference in the scores after the intervention. However, the changes in the mean scores of students' critical thinking in the control group did not show a significant difference before and after the intervention. These results indicated the positive impact of portfolio education on enhancement of critical thinking skills since the portfolio promotes discussion and feedback, analysis of experiences, autonomy and self-assessment in facing clinical situations.

In a study on Canadian nursing students, Mc Grath reported a high mean score of critical thinking. He attributed the use of modern teaching methods and active learning strategies in creating knowledge, motivation and skills for developing critical thinking[25].

Youngblood & Beitz stated that education through portfolio, journal, and case study promoted critical thinking through reflection, sensitivity, and insight[34].However, the results of Magnussen et al.'s study, as well as Inouye &Flannelly's, showed that there was no difference between the critical thinking score in the problem-solving-learning group and the control group[35, 36] .

Critical thinking is reasoning and attitudinal process which consists of many mental skills. Training method is effective in applying this skill. What critical thinking is and how it can be applied to different situations requires training and learning[1] .

Critical thinking skills, which include inference, identification of assumptions, interpretation and evaluation, play a key role in making decisions and taking care[37]. In thinking skill, the discovery of the root cause of answering questions should be taught. Acquiring these skills requires to teach how to apply the theories [24]. Because of the nature of refinement and evaluation, the portfolio enables this skill to be acquired.

By evaluating the results of the present study, it is believed that the daily and repeated use of the portfolio during an internship period has a positive effect on improving all dimensions of critical thinking of the students.

In a study, Khalili et al. examined the effect of teaching critical thinking strategies, including in-class and out-of-classroom writing assignments, on improvement of critical thinking skills. The results showed that critical thinking skills of nursing students' were improved[38].

Based on the findings, it can be concluded that critical thinking is an essential part of professional responsibility and it improves the quality of nursing care which can be taught and learned. According to the results of the present study and similar studies, it can be concluded that critical thinking of Iranian nursing students is unstable. Therefore, it seems that planning and education authorities should teach critical thinking as an important competency in clinical practice and take advantage of new educational strategies to enhance critical thinking in nursing education.

CONCLUSION

Because traditional teaching methods deprive students of critical thinking and increase their retention and moreover they are in line with parrot preservation,[39]it seems that it is time to review and improve the current educational system and to correlate the scientific content with proper planning and implementation of specific strategies along with specific techniques. Critical thinking skills should be trained in nursing education system so that graduates can solve patients' problems and achieve the goals of high level learning such as critical thinking and creative thinking.

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